

12. (Amended) In a vacuum-assisted resin transfer molding process, the improvement comprising:

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throttling vacuum lines connected in fluid communication with double bagging surrounding a debulked preform so that the mass flow rate of resin through the debulked preform substantially equals the mass flow rate of resin in the vacuum lines.

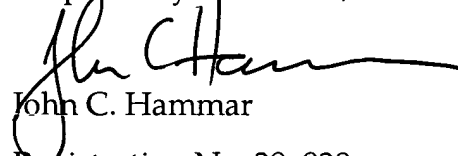
Please cancel claims 3 and 9.

REMARKS

Claims 1, 2, and 4 - 8, and 10 - 12 are pending in this application following this amendment. Applicant believes that the Examiner will find the claims to be in condition for allowance upon consideration and examination. The amendments should overcome the § 112 issues.

Applicant respectfully traverses the rejection of the claims § 103(a) as being obvious. The references individually or collectively fail to describe a process that uses two vacuum bags for vacuum integrity and control of bag relaxation made from a material that also resists wrinkling in combination with a flow media of the specified characteristics to provide control of the flow front. Control of the flow front and laminate quality are key factors for making aerospace-grade composites. No reference teaches or suggests throttling the vacuum lines to achieve a matched mass flow rate, as claim 12 claims. Please reconsider the amended claims.

Respectfully submitted,



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Marked Up Version of Changes to the Specification

The Abstract on page 59:

[Boeing is actively engaged in the production of lightweight composite airframes for both military and commercial applications.] The double bag vacuum infusion process of the present invention provides a low cost[,] method for producing complex composite assemblies without an autoclave. It also enables the production of highly innovative structures. The quality of the composites produced using such an infusion process are comparable to composites made using prepregs, hand layup or fiber placement, and autoclave curing. Double bagging provides vacuum integrity, controls bag relaxation while flow media controls the flow front to allow high quality aerospace-grade products.

Marked Up Version of Changes to the Claims

1. (Amended) A vacuum-assisted resin transfer molding process for making a laminate, comprising the steps of:

- (g) [assembling] assembling a preform from suitable reinforcement, in a mold;
- (h) tackifying the preform with a tackifier containing toughening agents for improved damage tolerance in the mold to produce a tackified preform;
- (i) vacuum debulking the [tackifier] tackified preform;
- (j) double bagging the debulked preform with an inner bag and outer bag using high elongation, low modulus nylon bagging films to control bag relaxation and to improve vacuum integrity while minimizing bag wrinkles; [and]
- (k) enclosing an open weave flow control media between the inner bag and the debulked preform to control the flow front during resin infusion, the flow media having modest permeability, including fill fibers that act as weirs to the infusing resin, is able to withstand exposure to temperatures up to about 600°F, is chemically inert, and is (stiff) but pliable to eliminate markoff on the bag side of the laminate; and
- (l) infusing resin [to] into the debulked preform through the flow media using a vacuum-assisted resin transfer molding process.

10. (Amended) An improved vacuum-assisted resin transfer molding process for infusing resin into a preform, the improvement comprising:

introducing resin to a flow media at the lowest point in the bagged preform assembly so that infusing resin flows against gravity through the flow media and preform, thereby providing improved control of the wavefront by higher resistance to flow than with horizontal infusion, the flow media having an open weave, having modest permeability, including fill fibers that act as weirs to the infusing resin, is able to withstand exposure to temperatures up to about 600°F, is chemically inert, and is stiff but pliable to eliminate markoff on the bag side of the laminate.

12. (Amended) In a vacuum-assisted resin transfer molding process, the improvement comprising:

throttling vacuum lines connected in fluid communication with [the] double bagging surrounding a debulked preform so that the mass flow rate of resin through the debulked preform substantially equals the mass flow rate of resin in the vacuum lines.